



# Oregon

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Dear Agnes and Andrew,

We thank you for the opportunity to review the September 4, 2008 Draft "Adaptive Management Team Total Dissolved Gas in the Columbia and Snake Rivers Evaluation of the 115 percent Total Dissolved Gas (TDG) Forebay Requirement" developed by the Washington Department of Ecology (DOE) and Oregon Department of Environmental Quality (DEQ). In general, we believe you have accomplished a fair and complete representation of the material presented in the forum.

You requested that comments also be made on the accuracy of conclusions drawn from the presentations made to the Adaptive Management Team (AMT). We would like to suggest that the scope of the analysis conducted by Bonneville Power Administration, the U.S. Army Corps of Engineers and NOAA Fisheries (Action Agencies) was too narrowly focused on the spill volumes provided in the 2008 Biological Opinion. This Biological Opinion contains spill amounts that are substantially less than provided since 2005 under the Court Ordered spill program. The Biological Opinion constrains spill during the peak of the spring migration to increase transportation. The Water Quality Agencies have specifically stated that they do not intend to address transportation in the AMT. Therefore, analyses to determine the benefits of spill under alternative TDG constraints should be done under a full range of spill operations including those provided in recent years under the Court Order where spill is not interrupted to maximize transportation.

Given that there is question regarding the best operational spill scenario to implement in the near future, the DOE and DEQ should consider the entire breadth of possible changes in survival that could occur under the implementation of alternative spill programs. This would give

you a broader foundation upon which to see the potential benefits of increases in fish survival using other possible scenarios than just the 2008 Biological Opinion.

The Fish Passage Center presented to the AMT an analysis with expected volume changes under a range of spill scenarios, based on empirical data from four different years. The Fish Passage Center also presented a statistical analysis of the importance of spill using the spill proportion variable, which describes the spill that each group of fish was exposed to during their juvenile migration. The U. S. Fish and Wildlife Service (USFWS) presented the results of the Comparative Survival Study (CSS) study to the AMT, showing the relation between increasing spill and increasing survival for juvenile Chinook and steelhead, using the spill proportion variable calculated by the Fish Passage Center for the groups used in their analysis. The DOE and DEQ asked the USFWS if they could estimate changes in juvenile fish survival under these different spill scenarios. The following are the summaries of model runs requested using the data and analyses presented to the AMT.

The CSS study quantified the effects of spill on juvenile yearling Chinook and steelhead in the Snake River (Lower Granite to McNary dams) and on yearling Chinook in the lower Columbia River (McNary to Bonneville dams). However, spill effects for steelhead in the Lower Columbia were not identified in the CSS, likely due to the low sample sizes. As can be seen in the Table 1 below, the CSS analyses predict that the absolute increase in juvenile yearling Chinook survival from Lower Granite Dam to McNary Dam would range from 0% to 7%, dependent on the spill scenario and flow year chosen (see Table 1 for a description of flow years and spill programs used) and would range from 1% to 17% for steelhead. This contrasts with the 0.2% for yearling Chinook, and 0.1% for Steelhead, estimated by COMPASS and presented by the Action Agencies for the same river reach. The CSS analyses also predict an increase of 0% to 7% for yearling Chinook in the Lower Columbia in contrast to no increase simulated by COMPASS.

In addition, the CSS analyses predict that the juvenile yearling Chinook travel time from Lower Granite Dam to McNary Dam would decrease by 0.0 to 3.6 days, dependent on the spill scenario and flow year chosen, and would decrease by 0.0 to 1.5 days for steelhead. The CSS analyses also predict a decrease of 0.0 to 1.5 days for yearling Chinook in the Lower Columbia.

The CSS results illustrate that the benefits to juvenile, and subsequently adult, salmonid survival are a function of the spill level and that juvenile survival increased at higher spill levels.

		<b>Absolute increase in survival (%) from base case</b>		
		FBRestricted	120 limited	120 Unlimited
<b>Lower Granite to McNary</b>				
2003	Steelhead	0%	3%	8%
2005	Steelhead	0%	2%	5%
2006	Steelhead	1%	2%	6%
2007	Steelhead	2%	4%	17%
<b>AVG</b>		<b>1%</b>	<b>3%</b>	<b>9%</b>
wild				
2003	Yearling Chinook	0%	1%	3%
2005	Yearling Chinook	0%	1%	3%
2006	Yearling Chinook	0%	1%	2%
2007	Yearling Chinook	1%	2%	7%
<b>AVG</b>		<b>0%</b>	<b>1%</b>	<b>4%</b>
hatchery				
2003	Yearling Chinook	0%	1%	3%
2005	Yearling Chinook	0%	1%	3%
2006	Yearling Chinook	0%	1%	3%
2007	Yearling Chinook	1%	2%	7%
<b>AVG</b>		<b>0%</b>	<b>1%</b>	<b>4%</b>
<b>McNary to Bonneville</b>				
2003	Yearling Chinook	0%	1%	5%
2005	Yearling Chinook	0%	2%	7%
2006	Yearling Chinook	0%	1%	2%
2007	Yearling Chinook	0%	1%	4%
<b>AVG</b>		<b>0%</b>	<b>1%</b>	<b>5%</b>

**Table 1. Absolute percentage increase in juvenile survival expected under different spill scenarios. Spill scenarios as described in Fish Passage Center AMT presentation on December 13, 2007. (Note: no planned spill occurred at Lower Granite, Little Goose and Lower Monumental dams during the spring of 2005). Base Case: actual spill estimated for each of the four years, 2003, 2004, 2005 and 2007. FBRestricted: spill that would have occurred if all projects spilled to the 120% cap on days when spill was restricted by the 115% downstream forebay, but not the 120% tailrace. 120 Limited: Spill that would have occurred in that year if all projects spilled to the 120% cap, limited by planned spill. 120 Unlimited: Spill that would have occurred in that year if all projects spilled to the 120% cap, not limited by planned spill.**

Recently NOAA Fisheries and the Oregon Department of Fish and Wildlife requested that the Northwest Power and Conservation Council’s Independent Scientific Advisory Board (ISAB) review the 2008 Biological Opinion recommendation for terminating spill and maximizing transportation during May. The ISAB concluded that there were analyses in addition to those considered in the 2008 Biological Opinion that indicate that as spill increases, in-river survival increases and the relative benefit of transportation decreases. In addition, the ISAB report included a recommendation that the Court Ordered spill levels that were implemented in the last few years continue until sufficient adult returns have occurred to evaluate the effectiveness of increased spill.

<b>Absolute decrease in fish travel time (days) from base case</b>				
			120	120
		FBRestricted	limited	Unlimited
<b>Lower Granite to McNary</b>				
2003	Steelhead	0.0	0.3	0.7
2005	Steelhead	0.0	0.2	0.6
2006	Steelhead	0.1	0.2	0.5
2007	Steelhead	0.2	0.4	1.5
<b>AVG</b>		<b>0.1</b>	<b>0.3</b>	<b>0.8</b>
wild				
2003	Yearling Chinook	0.1	0.7	1.6
2005	Yearling Chinook	0.0	0.6	1.6
2006	Yearling Chinook	0.2	0.5	1.3
2007	Yearling Chinook	0.5	0.8	3.2
<b>AVG</b>		<b>0.2</b>	<b>0.7</b>	<b>1.9</b>
hatchery				
2003	Yearling Chinook	0.1	0.7	1.8
2005	Yearling Chinook	0.1	0.7	1.8
2006	Yearling Chinook	0.2	0.7	1.7
2007	Yearling Chinook	0.6	1.0	3.6
<b>AVG</b>		<b>0.2</b>	<b>0.8</b>	<b>2.2</b>
<b>McNary to Bonneville</b>				
2003	Yearling Chinook	0.1	0.2	1.2
2005	Yearling Chinook	0.0	0.4	1.5
2006	Yearling Chinook	0.1	0.2	0.4
2007	Yearling Chinook	0.0	0.1	0.9
<b>AVG</b>		<b>0.1</b>	<b>0.2</b>	<b>1.0</b>

**Table 2. Absolute decrease in fish travel time under different spill scenarios. Spill scenarios as described in Fish Passage Center AMT presentation on December 13, 2007. (Note: no planned spill occurred at Lower Granite, Little Goose and Lower Monumental dams during the spring of 2005.)**

We suggest that the weight of evidence approach discussed in the AMT play an important role when developing the Agencies' recommendation. The agencies' should determine if sufficient information has been provided to assess the potential benefit to fish survival from the removal of the forebay TDG gauge from in-season spill management. The weight of evidence approach can be used to assess the relative importance of the information presented to the AMT describing the role of spill to fish survival, the impacts of TDG based on gas bubble trauma monitoring conducted over the past 14 years, as well as expected outcomes based on modeling approaches.

In summary, the DOE and DEQ, when developing the Agencies' recommendation, should consider the full range of potential benefit to salmon survival from changes in the 115% forebay and 120% tailrace total dissolved gas management. The narrow scope of the assumptions used for

spill affected the simulated results by the Action Agencies using the COMPASS model. Other analyses (e.g., the CSS) indicate substantial improvements in juvenile Chinook and steelhead in-river survival as the percentage of spill increased.

Again, we would like to thank the Oregon Department of Environmental Quality and the Washington Department of Ecology for establishing the Adaptive Management Team under the TMDL Process for consideration of the use of forebay monitors for compliance with water quality standards and waivers for total dissolved gas. We appreciate the considerable time and effort and good work that you have put into this process. This AMT has been a valuable forum for all interested parties to provide input to the use of forebay monitors in spill management and has served as a valuable venue for the exchange of information. Please let me know if you have any questions on information presented.

Sincerely,

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C: Ed Bowles, Tony Nigro, Rick Kruger